

Tapping & Stopping Steel & CI Pipe Using Mechanical Methods

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TAPPING & STOPPING

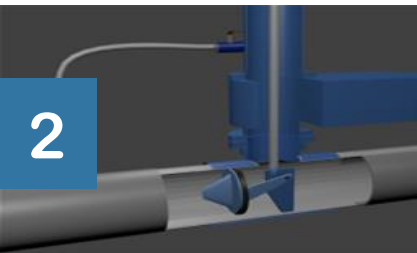
Introduction — Three Key Points



What is hot tapping?

Hot tapping is an operation that allows gas workers to make a connection to existing pipeline without interrupting or emptying the gas from that section.

- **The upside.** Workers can maintain and modify the pipeline while it continues to operate.
- **The downside.** Conventional tapping and stopping equipment and methods may cause gas to blow.



When is it necessary?

It may be necessary for both emergency and routine operations: repair, relocation, replacement, retirement, new line installation, abandonment.



Who is responsible for setting the standards at your company?

At Eversource, our Gas Engineering Group is responsible for —

- generating standards and procedures that meet — and sometimes exceed — industry requirements.
- approving the types of tools & equipment used in the performance of this task.

TAPPING & STOPPING

What We'll Cover

Section 1
SAFE WORKING CONDITIONS

Section 2
TYPES OF FITTINGS

Section 3
GENERAL STEPS

Section 4
**ABNORMAL OPERATING CONDITIONS
(AOCs)**

The background features abstract blue geometric shapes, including triangles and lines, primarily on the left and right sides, set against a white background.

Section 1

SAFE WORKING CONDITIONS

SAFE WORKING CONDITIONS

Workers promote safe working conditions when they —

- Arrive prepared for the task.
- Follow the company's and manufacturer's instructions.
- Remain alert, focused — and avoid distractions.



SAFE WORKING CONDITIONS

No Blow
Technology

The Competent
Person

Work Order
Review

Arc
Prevention

Gas Control
Notification

Under
Pressure

Suiting
Up

Trapped
Gas

The Right Tools,
The Right Way

Check & Protect
the Site



SAFE WORKING CONDITIONS

No Blow Technology

What is No Blow Technology?

No Blow Technology in tapping & stopping equipment is a game changer: Tapping & stopping no longer needs to cause gas to blow. And when gas doesn't blow, four great things come of it:

Everyone — and everything — is safer.

No Blow Technology puts safety first.

The risk of dropping customers is reduced.

No Blow Technology reduces the likelihood that this happens during routine maintenance or construction activities.

The company's carbon footprint is reduced.

Eliminating blowing gas and the introduction of methane into the environment can help to reduce a company's carbon footprint and its impact.

The company's brand is protected.

A utility company that puts safety first, champions reliable service, and acts as a steward of the environment stands a good chance of protecting its public image. No Blow Technology can help protect a company's brand.

SAFE WORKING CONDITIONS

Work Order Review



BE PREPARED — WHAT IT TAKES

Workers are expected to arrive at the site prepared — and a review of the job's work order helps them to assemble the right tools and materials before they begin work.

An Eversource work order (or job brief) provides:

- a review of the procedure
- a checklist of necessary tools & materials

At this stage, key considerations are —

- **The number of feeds in a main.** *Is it one or two?* Multiple feeds may require multiple stopping methods.
- **The need for a bypass.** To prevent service interruption, a bypass may be required to allow gas to flow around the stopped area.

SAFE WORKING CONDITIONS

Gas Control Notification



WHO MONITORS & CONTROLS YOUR SYSTEM? Give 'em a heads-up.

At Eversource, monitoring and flow control of all Eversource gas pipelines is the responsibility of Eversource Gas Control — for both radial and loop systems.

Eversource workers are required to notify Gas Control in advance of all main tapping & stopping activities.

SAFE WORKING CONDITIONS



Suiting Up

Workers should maintain, inspect, and wear Personal Protective Equipment (PPE) appropriate for the task.

Examples:

- hard hat
- eye protection
- safety glasses/goggles/face shield
- hearing protection
- flame retardant gloves
- protective footwear
- flame retardant clothing
- SCBA/SAR/respiratory equipment
- fire suits

SAFE WORKING CONDITIONS

GENERAL GUIDELINES

Use only company-approved tools.

The manufacturer's ratings for tapping tools must meet or exceed the Maximum Allowable Operating Pressure (MAOP) of the pipeline.

Get familiar with the tool.

Before workers use tapping & stopping tools, they should familiarize themselves with the manufacturer's instructions for tool inspection, maintenance, and operation.

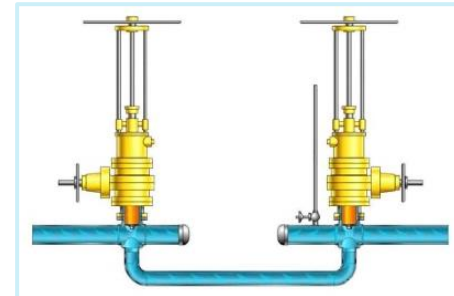
Inspect the tool before it's used.

The tool should be clean, in good working order, without loose, missing, or damaged parts — and the grounding attachment points should be secure.

Stay within the specs.

Never exceed the manufacturer's specifications for proper use of a tool.

The Right Tools,
The Right Way



SAFE WORKING CONDITIONS

Check the atmosphere

Workers need to check that atmospheric conditions are safe —

- before they begin work at a site
- continuously throughout their work

Secure the site

Workers protect themselves, the public, and the environment when they secure the site by —

- setting up appropriate Work Area Protection
- preventing public access to the site
- excavating according to standards and procedures
- placing fire extinguishers upwind

Eliminate or mitigate potential ignition sources

Workers need to identify — and mitigate or eliminate — potential ignition sources:

- static electricity
- use of cell phones/electric switches
- running vehicle engines/electric motors
- smoking/open flame
- welding/grinding

Check & Protect
the Site



SAFE WORKING CONDITIONS

A supervisor or a competent person needs to be present during a hot tapping or stopping operation.

The Competent Person



SAFE WORKING CONDITIONS



Arc
Prevention

Creating a Difference

If metallic pipe is cut or separated during bonding, a pipe potential difference may be created — which also introduces the possibility of a worker being injured by an electric arc.

Installing a Bonding Wire

To prevent an electric arc caused by this difference in potential, workers need to place an approved bonding wire across the intended opening — prior to cutting and removing a section of pipe.

SAFE WORKING CONDITIONS

MANNING THE MANOMETER

If the operation includes stopping or diverting gas flow with a stopper or bypass, workers are assigned to monitoring a manometer that gauges pressure on both sites of the operation. Responsibilities include:

- **Referencing the baseline.** The pipeline's Minimum Acceptable Pressure limits are used as a baseline.
- **Recording.** Recording both Minimum Acceptable Pressure limits and current pressure readings during stop-off and pipe cutting.
- **Communicating changes.** Communicating unexpected pressure changes to fellow workers — and reporting abnormal pressure changes to the competent person.
- **Confirming final pressures.**

Under
Pressure



SAFE WORKING CONDITIONS

MANNING THE MANOMETER (cont.)

- **Gauge location.** Place the gauge close to the stop-off location — so the worker monitoring the pressure can readily communicate with the workers performing the operation.
- **Cutting pipe.** Workers should cut pipe only if the pressure is acceptable and stable.
- **A drop to zero.** If pressure drops to 0 INWC, workers should notify the competent person and perform an emergency shutdown — without removing the stopping device.

Under
Pressure



SAFE WORKING CONDITIONS

Use of Vent Stacks

To initiate a safe, controlled release of trapped gas:

- Install a vent stack with a valve.
- Extend the vent stack approximately 7' above ground level.

Methods Vary

Methods to release trapped gas may vary depending on stop-off requirements.

Always follow your company's policies and procedures for releasing trapped gas.



Trapped
Gas

The background features abstract blue geometric shapes, including triangles and lines, on a white background. The shapes are layered and semi-transparent, creating a modern, technical aesthetic.

Section 2

TYPES OF FITTINGS

TYPES OF FITTINGS

Clear guidance is required.

A company's standards — and the manufacturer's instructions — should provide clear guidance for the selection and installation of tap fittings.

A fitting's diameter is key.

A fitting's diameter must be appropriate for the pipe, tapping tool, and stopper.



TYPES OF FITTINGS

Threadolet &
Weldolet

Bolt-On
Saddles

CI Pipe
Tapping &
Threading

TYPES OF FITTINGS



Threadolet &
Weldolet



Threadolets & weldolets are the preferred fittings for tapping steel mains.

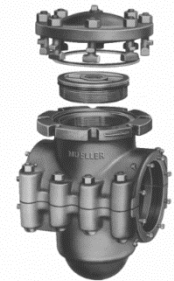
Before the tapping process begins, a trained welder prepares the pipe and welds the fitting directly onto it.

After these fittings are welded onto the pipe, gas will escape when the tapping tool is removed without the use of no-blow equipment.

TYPES OF FITTINGS

When welding isn't possible, bolt-on saddles or "Servi-Seal" clamps are used for tapping cast iron or steel.

Bolt-On Saddles



After these fittings are installed, gas will escape when the tapping tool is removed without the use of no-blow equipment.

TYPES OF FITTINGS

Direct cast iron pipe tapping and threading is used for low pressure CI pipe stopping and service connections.

CI Pipe
Tapping &
Threading



After these fittings are installed, gas will escape when the tapping tool is removed without the use of no-blow equipment.

The background features abstract blue geometric shapes, including triangles and polygons, in various shades of blue, set against a white background. The shapes are positioned primarily on the left and right sides of the frame.

Section 3

GENERAL STEPS

GENERAL STEPS

1
Prepare
the Site

2
Prepare
to Tap

3
Complete
the Tap

4
Stop
Gas Flow

5
Re-Establish
Gas Flow

6
Document
the Work

GENERAL STEPS

1 Prepare the Site

At Eversource, our workers —

1. Excavate separate holes for mains and services larger than 2”.
2. Verify pipe material and diameter.
3. Arrange for a qualified technician to install a proper fitting.
4. Prepare a vent stack.
5. Reinforce cast iron pipe.
6. Inspect the determined tap location for damage, corrosion, pitting, or graphitization.
7. Clean the pipe’s surface in the area where the tap will be installed.



Always follow your company’s procedures and the manufacturer’s instructions.

GENERAL STEPS

2 Prepare to Tap

1. Secure tap fittings on the pipe.
2. Pressure test and soap test the fitting, fitting cap, and completion plug.
3. Prepare the cutter tool according to manufacturer's instructions.
4. Not all cutters require the same prep. Example: A TD Williamson cutter must be clean, while a Mueller cutter requires an application of grease.
5. Assemble the tapping tool, fittings, a slide/gate valve, piping, and manometers.
6. For most tapping tools, workers need to predetermine drilling travel distance. Exception: The Mueller B-101. This machine lets you know when the tap is complete: Either the sound of the power head changes or hand tool effort decreases.
7. Attach tapping machine to pipe or fitting.
8. Open the valve.
9. Air pressure test the tapping machine and fitting with soap solution.



GENERAL STEPS



3 Complete the Tap

1. Drill through pipe until the tap is complete.
2. Retract the drill to a point above the slide/gate valve.
3. Close the slide/gate valve.
4. Bleed down the pressure and make sure you have a complete seal at the valve.
5. Remove the tapping machine.
6. Retrieve and inspect the coupon for internal corrosion.
7. To clean the main of burrs, metal chips, or filings, install a sweeper assembly onto the valve. Next —
 - Open the valve.
 - Push the sweeper tool through the valve and sweep away any chips in the pipe.
 - Retract the sweep tool.
 - Close the valve and bleed down the pressure.
 - Remove the sweeper assembly.

GENERAL STEPS

1. Open the valve.
2. Insert the stopper through the valve into the pipe to stop gas flow.
3. Monitor all gauges for any sign of pressure loss.

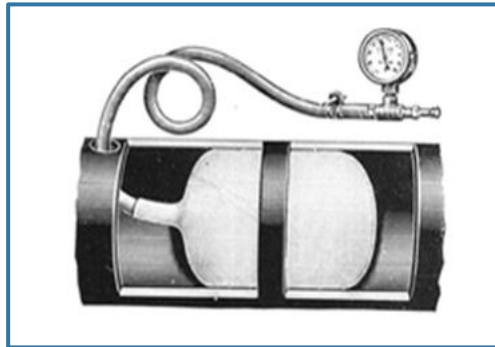
4
Stop
Gas Flow



GENERAL STEPS

1. Slowly loosen the stopper to equalize pressure in the pipe.
2. Retract the stopper.
3. Close the valve.
4. Install a fitting or completion plug with pipe dope.
5. Check the bleed-off valve to verify the completion plug is seated. If gas doesn't bleed down, the completion plug didn't seat properly; it must be re-seated.
6. Remove the side valve.
7. Install a flange cap or threaded cap with pipe dope.
8. Soap test the cap and adjacent fittings.

5
Re-Establish
Gas Flow



GENERAL STEPS

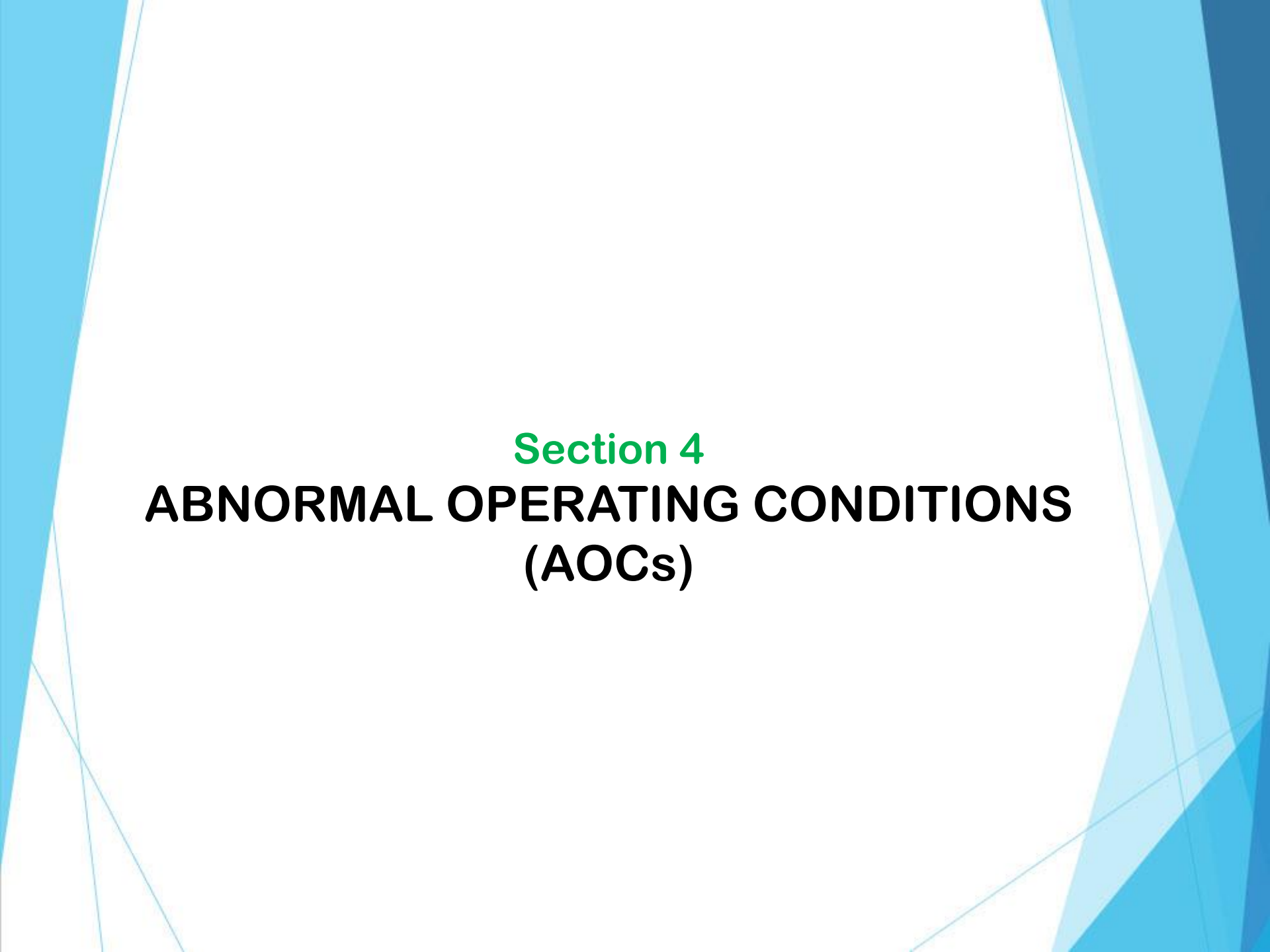
Gas operators are required to maintain a record of all fittings installed on a steel pipeline.

The recorded information may include, but is not limited to —

- Name of the worker completing the task
- Date
- Address or description of the pipe location
- Pressure test information
- A sketch of the installed tapping fittings and their measurements

The image shows a detailed 'DAILY ACTIVITY REPORT' form from Eversource, numbered 0193052. The form is divided into several sections: 'GENERAL INFORMATION' at the top, followed by 'JOB INFORMATION', 'WORKER INFORMATION', and 'TAPPING INFORMATION'. The 'TAPPING INFORMATION' section includes a large table with columns for 'DATE', 'TIME', 'WORKER', 'LOCATION', 'PIPE SIZE', 'FITTING SIZE', 'FITTING TYPE', 'FITTING MATERIAL', 'FITTING COLOR', 'FITTING WEIGHT', 'FITTING LENGTH', 'FITTING DIAMETER', 'FITTING THICKNESS', 'FITTING WEIGHT', 'FITTING LENGTH', 'FITTING DIAMETER', and 'FITTING THICKNESS'. Below the table is a 'SKETCH OF TAPPING FITTINGS' section with a grid and a north arrow. The form is filled out with handwritten and printed information, including dates, times, worker names, and locations.

6
Document
the Work

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Section 4
ABNORMAL OPERATING CONDITIONS
(AOCs)

ABNORMAL OPERATING CONDITIONS (AOCs)

Tapping & Stopping Metallic Pipe

| RECOGNIZE | REACT |
|---|--|
| INSUFFICIENT SHUTOFF | <ul style="list-style-type: none">Remove and reset the stopple/stopper. |
| UNEXPECTED PIPE TYPE, SIZE, OR PRESSURE | <ul style="list-style-type: none">Stop work.Address the situation. |
| DROPPED COUPON | <ul style="list-style-type: none">Take necessary measures to retrieve the dropped coupon from within the pipe. |
| PLUG FAILS TO SEAT | <ul style="list-style-type: none">Check pipe for chips.Make sure the plug or fitting is in usable condition.Re-seat the plug. |
| SPECIALIZED EQUIPMENT FAILURE | <ul style="list-style-type: none">Stop work.Make the area safe.Notify supervision and request that equipment is repaired or replace. |

ABNORMAL OPERATING CONDITIONS (AOCs)

Tapping & Stopping Metallic Pipe

| RECOGNIZE | REACT |
|----------------------------------|---|
| PIPELINE DAMAGE | <ul style="list-style-type: none">• Inspect the damage piece.• If necessary, notify qualified personnel who will replace the pipe. |
| UNEXPECTED RELEASE OF GAS | <ul style="list-style-type: none">• Notify supervision and request that qualified personnel repair or replace the damaged area. |
| IGNITION OF RELEASED GAS | <ul style="list-style-type: none">• Call 911.• Follow emergency response procedures. |
| OVER-PRESSURIZATION | <ul style="list-style-type: none">• Stop work.• Make the area safe.• Notify supervision. |
| PRESSURE DROP TO 0 INWC | <ul style="list-style-type: none">• Do not remove stopping device.• Notify the person in charge on the site.• Perform emergency shutdown. |



Tapping & Stopping Steel & CI Pipe Using Mechanical Methods

THANK YOU